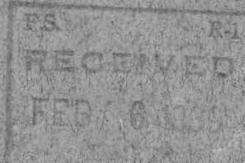


UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
FOREST INSECT INVESTIGATIONS



TENTH ANNUAL SURVEY OF THE INSECT INFESTATIONS
OF THE COEUR D'ALENE NATIONAL FOREST
-1938-

By
Tom T. Terrell
Scientific Aide

Forest Insect Laboratory
Coeur d'Alene, Idaho
February 3, 1939

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FOREWORD

The following report by Mr. T. T. Terrell shows the present status of the mountain pine beetle within the white pine stands of the Coeur d'Alene National Forest. On some units within the Grizzly and Shoshone districts the situations are considered as being sufficiently alarming to arouse the reader's interest as to the action considered necessary for the prevention of subsequent damage.

Prior to the completion of the survey the status of the infestation on these areas was presented to forest officials through correspondence and by conference. Artificial control measures were not recommended, for although the 1938 loss of white pine was quite severe, all available data pointed towards the existence of a peak in the severity of the outbreak and a natural reduction of the bark beetle population in 1939. Under such circumstances the institution of control was considered an ill-advised procedure.

This prediction was based upon data obtained from the mountain pine beetle infestation study, that has as its final objective the effective and economic direction of bark beetle control. Although this study project has not approached completion, it was believed that sufficient progress had been made to warrant this test of the present interpretation of the data obtained.

JAMES C. RVEDEN
Senior Entomologist

TENTH ANNUAL SURVEY OF THE INSECT INFESTATIONS
OF THE COEUR D'ALENE NATIONAL FOREST
1938

The annual survey of the mountain pine beetle infestation in the white pine stands of the Coeur d'Alene Forest was started August 1 and ended September 8, 1938. An average of 4.5 percent of the white pine type was examined, although this percentage varied considerably on individual units. Data were taken on the number of green trees of 8 inches d.b.h. and over as well as the number of insect-infested trees. In this manner the percentage of the stand killed was computed. The sample strip method was used as in the past surveys--strips one chain in width and approximately three miles in length were projected so as to secure representative samples of the area. Data secured were recorded every ten chains.

An outstanding condition not previously appreciated was disclosed by a check survey made the latter part of October of the Cascade Creek drainage, which had been previously surveyed the first week in August. The purpose of this survey was to secure some idea of the number of attacks that had occurred subsequent to the first survey. Although the per-acre figure of trees containing broods of the mountain pine beetle was practically the same for the two surveys, during the second operation a number of trees were recorded that were undoubtedly early 1938 attacks from which the insects had emerged between the two surveys. This discovery shows that during long, dry seasons such as experienced during

the past two years, some, if not all, of the June attacks produced broods that emerged during the late August and September. As a result of this abnormal emergence it is apparent that during such seasons a much greater volume of timber is lost than is actually indicated by the trees which contain broods of the mountain pine beetle.

The following tabulation and unit descriptions show the status of the infestation within the Coeur d'Alene as revealed by the Coeur d'Alene survey.

TABLE I
MOUNTAIN PINE BEETLE INFESTATION
ON THE COEUR D'ALENE NATIONAL FOREST 1938

Unit	Acres						% of stand	Infested trees
		Infested trees per acre			killed		killed	Infested trees
		1935	1936	1937	1938	1938	1938	1938
Little River District								
Forks	1,100	.377	.026	.039	.021	.71		23
Tom Lavin	3,000	.058	.061	.020	.009	.17		27
Iron Cr.	4,120	.328	.042	.041	.133	.14		548
Cathcart	3,200	.050	.023	.020	.074	.96		237
Cascade	3,640	.201	.100	.124	.233	1.32		848
Picnic	1,680	.089	.067	.033	.036	.61		60
Honeysuckle	5,320	.175	.116	.177	.059	.41		314
Leiberg	4,440	.114	.014	.016	.093	.95		413
Laverne	2,560	.146	.077	.045	.155	.78		397
Copper	4,000	.144	.0	.079	.161	.12		644
Total	33,060	.159	.054	.069	.094	.94		3,098
Grizzly Mountain District								
Taylors	2,800	.135	.017	.272*	.485	3.00		1,358
Forks-Cabin	5,440	.224	.029	.234*	.369	1.13		2,007
Can Creek	1,760	.200	.018	.156	.651	2.26		1,146
West Fork	3,960	.098	.037	.118	.298	1.54		1,125
Clay Cr.	2,320	.271	.059	.240*	.475	1.24		1,102
Lower Cougar	3,600	.176	.033	.100	.091	.64		328
Upper Cougar	3,700	.120	.038	.091	.179	.98		662
Bumblebee	3,040	.146	.019	.198	.342	3.15		1,040
Total	26,620	.168	.032	.174	.329	1.54		8,768
Shoshone District								
Sissons	4,700	.306	.099	.221	.356	1.38		1,673
Yellow Dog River	2,140	.500	.233	.587*	.505	1.5		1,081
Yellow Dog Cr.	4,120	.139	.129	.166	.246	.56		1,093
Downey	4,160	.383	.078	.391*	.341	.97		1,419
N. Yellow Dog	840	.800	.034	.112	.200	.67		168
Lower Flat Cr.	4,120	.026	.023	.058	.112	.54		461
Bennett Cr.	580	.214	.037	.0	.033	.15		19
Brett-Miner	1,550	.200	.010	.077	.016	.26		25
Rock City	1,600	.067	.013	.040	.048	.35		77
Hawksite	8,780	.097	.024	.033	.075	.43		658
Cabin Cr.	7,000	.223	.048	.089	.129	.69		903
Total	39,590	.212	.064	.152	.191			7,577
Forks District								
Big Elk	4,960	.184	.062	.063	.054	.25		268
Potter Cr.	3,800	.329 ^{med.} 100	.058	.091	.31			346
Stewart	2,200	.073	.023	.103	.093	.54		205
Upper Flat Cr.	3,680	.134	.034	.022	.242	1.9		890
Total	14,640	.192	.059	.057	.117			1,709
	113,910	.184	.053	.121	.186			21,152

* Indicates control measures

FORKS UNIT

1,100 Acres

Acres of sample strip	Trees on strip		Trees per acre of strip	
	New attacks	Green trees	New attacks	Green trees
45	: 1	: 140	: .021	: 2.91

Percent of stand killed: .71

Total of infested trees: 23

While the timber in this unit has been recently logged, a strip of old mature trees were left along the Honey Creek road. Although there is practically no infestation in the area at present, the presence of these overmature trees is thought to constitute an infestation hazard.

TOM LAVIN

3,000 Acres

Acres of sample strip	Trees on strip		Trees per acre of strip	
	New attacks	Green trees	New attacks	Green trees
111	: 1	: 576	: .009	: 5.2

Percent of stand killed: .17

Total of infested trees 27

Logging operations in the Tom Levin unit during the past few years have reduced the timber stand to an average of only 5 trees per acre. Only a very light infestation, which can not be considered other than normal, now exists in the area.

IRON CREEK

4,120 Acres

Acres of sample strip	Trees on strip		Trees per acre of strip	
	New attacks	Green trees	New attacks	Green trees
157	: 21	: 1449	: .133	: 9.2

Percent of stand killed: .142

Total of infested trees: 548

Although the infestation in the Iron Creek unit has increased to a considerable extent this year, nearly all the infested trees found were marked for cutting. The logging operations in progress in the area will no doubt be instrumental in reducing the number of infested trees.

CATHCART UNIT

3,200 Acres

Acres of sample strip	:	Trees on strip	:	Trees per acre of strip	:			
	:	New attacks:Green trees	:	New attacks:Green trees	:			
94	:	7	:	804	:	.074	:	8.5

Percent of stand killed: .96

Total of infested trees: 237

There is no very serious infestation in this unit. Logging operations in the past have so reduced the stand that only seed trees remain. In this thinned stand, sun scorching of a large percentage of the remaining trees is common, and while these weakened trees are easily killed by insect attack, they do not present good brood development conditions.

CASCADE UNIT

3,640 Acres

Acres of sample strip	:	Trees on strip	:	Trees per acre of strip	:			
	:	New attacks:Green trees	:	New attacks:Green trees	:			
180	:	42	:	3,126	:	.233	:	17.4

Percent of stand killed: 1.32

Total of infested trees: 848

The infestation in the Cascade Creek unit is higher than in 1937 and is inclined to occur in groups, especially along the south side of Cascade Creek near the center of section A. A large percentage of the attacks were made in the midsummer period, about 20 percent occurring in the last week in July.

PICNIC UNIT

1,680 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	:
55	: 2	:	328	: .036 : 6.0

Percent of stand killed: .61

Total of infested trees: 60

The infestation in this logged area can no doubt be considered normal, as it has remained practically unchanged for the past three years.

HONEYSUCKLE UNIT

5.320 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	:
202	: 12	:	2,865	: .059 : 14.2

Percent of stand killed: .41

Total of infested trees: 314

Sample strip data recorded the insect infestation as being largely in the heavier stands along the creeks, with a lighter infestation on the ridges and slopes.

Stand-improvement logging along Deception Creek will remove many of the infested trees and should serve as a check against any further increase.

LEIBERG UNIT

4,440 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	:
86	:	8	:	832
			:	.093
			:	9.7

Percent of stand killed: .95

Total of infested trees: 413

The infestation in the Leiberg unit is largely in sun-scalded seed trees left from logging operations. Practically all of the timber is now on what is termed dry site and studies have shown that emergence from such trees is small.

LAVERNE UNIT

2,560 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	:
90	:	14	:	1,760
			:	.155
			:	19.5

Percent of stand killed: .78

Total of infested trees: 397

Although infested trees were found throughout the unit, the majority are in the stands along the creeks.

The infestation has increased to a considerable extent, but as yet it is not believed to constitute a serious hazard.

COPPER UNIT

4,000 Acres

	: Trees on strip	: Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	: New attacks:Green trees
137	: 22	: 1,763

Percent of stand killed: .123

Total of infested trees: 644

The increased infestation in Copper Creek unit is mostly in seed trees left during last year's logging operations. The seed trees were left in groups rather than the usual scattered system. In many instances several of the trees in these groups have been attacked. The remaining stand of timber has roads built into it for logging operations in the near future, and it is believed that the infestation will be held to a low status by annual logging.

TAYLORS UNIT

2,800 Acres

	: Trees on strip	: Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	: New attacks:Green trees
171	: 53	: 2,700

Percent of stand killed: 3.0

Total of infested trees: 1,358

Relatively heavy infestations exist in several areas within the unit. The heavier spots of infestation are located along the south and eastern sides of Barrymore Creek in sections 1 and 12, parts of section 2 on the Can Creek side, and a small drainage in section 10 and in Omaha

Creek. The attacks are largely heavily hit trees occurring in small scattered groups. Root fungus is very prevalent in this area and a high percentage of the attacked trees are infected.

FORKS-CABIN

5,440 Acres

Acres of sample strip	Trees on strip		Trees per acre of strip	
	New attacks:Green trees	;	New attacks:Green trees	;
312	: 115	:	10,003	: .369 : 4,295

Percent of stand killed: 1.13

Total of infested trees: 2007

While the 1937 insect survey recorded 0.234 infested tree per acre in this area, the figure was found to be about 40 percent low. The 1937 infestation was heavily grouped in concentrated areas and large numbers of trees were attacked in late summer and early fall by emerging parent beetles. Control measures instituted in these areas of concentrated infestation treated approximately 1,500 infested trees. Although the 1938 infestation shows approximately the same number of infested trees as the corrected 1937 data, the attacked trees are not badly grouped and are largely in trees weakened with root infection. The infestation is somewhat heavier on the southern slopes and the drier sites. This is believed to be due to a mixture of Douglas fir which has suffered a severe loss during the past few years from insect damage. The dead Douglas fir are practically all infected with root fungi and are believed to be acting as centers of root infection. Of six insect-attacked white pine found in one such area, five were badly infected with root fungi.

CAN CREEK UNIT

1,760 Acres

	Trees on strip	: Trees per acre of strip
Acres of sample strip	New attacks:Green trees	New attacks:Green trees
106	69	2.973 .651 28.0

Percent of stand killed: 2.26

Total of infested trees: 1,146

The infestation in the Can Creek unit is occurring largely on the drier sites in sections 35 and 36. Heavy losses have occurred to the Douglas fir stands on these drier areas in the past, and as these dead trees are largely infected with root fungus, it is felt that they have contributed to root infections in the white pine stands. It is also thought that the opening up of the stands through the destruction of Douglas fir and pine has been a contributing factor in the present infestation. As the stands are opened by dying trees the site is changed to one drier than the one to which the remaining stand is accustomed.

WEST FORK UNIT

3,320 Acres

	Trees on strip	: Trees per acre of strip
Acres of sample strip	New attacks:Green trees	New attacks:Green trees
224	31	3.773 .138 16.84

Percent of stand killed: .81

Total of infested trees: 458

WEST FORK CONCENTRATION UNIT

640 Acres

	Trees on strip	: Trees per acre of strip
Acres of sample strip	New attacks:Green trees	New attacks:Green trees
48	50	1,484 1.042 31

Percent of stand killed: 3.26

Total of infested trees: 667

Although this area contains a total of 3,980 acres, it has been divided into two parts, as a large percentage of the infestation occurs in 640 acres in section 33 near the mouth of the west fork. In this area of concentration the site is dry and the type is heavily mixed with Douglas fir and an occasional yellow pine. The heavy loss from root fungus in this locality during the past few years has made the white pine stand weak and irresistant. Serious losses are also occurring in the Douglas fir from insect attacks. The Black Canyon drainage, where the type is largely Douglas fir, is suffering a heavy loss from the Douglas fir beetle. Groups up to 190 trees are being killed.

CLAY CREEK UNIT

2,320 Acres

Acres of sample strip	Trees on strip	Trees per acre of strip
	New attacks:Green trees	New attacks:Green trees
158	: 75	: 5,946 : .475 :

Percent of stand killed: 1.2

Total of infested trees: 1,102

The infestation in Clay Creek is in largely scattered single trees with a tendency to group on open dry ridges. It is estimated that nearly 90 percent of the infested trees are also infected with root fungus. In the more heavily infested areas the attacked trees are often associated with insect-killed Douglas fir. Practically all the dead fir are infected with root fungus and no doubt are a factor in the infection of the pine.

LOWER COUGAR UNIT

3,600 Acres

	: Trees on strip	: Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	: New attacks:Green trees
91	: 9 : 1,403	: .091 : 15.4

Percent of stand killed: .64

Total of infested trees: 328

The infestation in the Lower Cougar Creek unit is unevenly distributed over the unit and is virtually the same as in 1937. Considerable Douglas fir is being killed by the Douglas fir beetle on the upper drier slopes.

UPPER COUGAR UNIT

3,700 Acres

	: Trees on strip	: Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	: New attacks:Green trees
151	: 27 : 2,717	: .179 : 17.99

Percent of stand killed: .98

Total of infested trees: 662

Small groups and single infested trees were recorded throughout the stands of the Upper Cougar unit. The groups, usually of three or four infested trees, in most instances occurred on dry southern slopes where considerable Douglas fir was also being killed by the Douglas fir beetle. The infestation of the Douglas fir beetle, which seems to be increasing rapidly, has destroyed from 5 to 10 percent of the stand. Although insects are recorded to be primarily responsible for the destruction of the Douglas fir, root fungi in these stands no doubt are a highly important factor.

BUMBLEBEE UNIT

3,040 Acres

	: Trees on strip	: Trees per acre of strip
Acres of sample strip	: New attacks;Green trees	: New attacks;Green trees
111	: 38 : 1,166	: .342 : 10.5

Percent of stand killed: 3.15

Total of infested trees: 1,040

The infestation in the Bumblebee unit has increased throughout the area. Spots of heavily infested trees are recorded in sections 25 and 30 along the north slopes. In this area the northern slopes are almost comparable to southern slopes in other areas as to dryness. The infestation is associated with insect-infested Douglas fir which are being killed in large numbers.

SISSONS UNIT

4,700 Acres

	: Trees on strip	: Trees per acre of strip
Acres of sample strip	: New attacks;Green trees	: New attacks;Green trees
261	: 93 : 6,619	: .356 : 25.4

Percent of stand killed: 1.38

Total of infested trees: 1,673

The infested trees in the Sissons unit occur on southern exposures and are largely light attacks with short infested lengths. Most of these trees are infected with root fungi. However, infested trees occurring on northern and western exposures are usually more heavily attacked and have a greater infested length. It is believed that these

trees represent about 25 percent of the total infestation. In a number of examinations of these heavily attacked trees a high degree of parasitism was found, even in quite recently attacked trees, and in several instances a high degree of brood mortality had already occurred.

YELLOW DOG RIVER UNIT

2,140 Acres

	: Trees on strip	:	Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	
107	: 54	:	3,471	: .505

Percent of stand killed: 1.5

Total of infested trees: 1,081

Although insect control measures were instituted in the Yellow Dog River unit during the fall of 1937, there are nearly as many reinfested trees again this year. However, there is evidence that quite a number of infested trees were missed during the 1937 control project, which could be partially responsible for the present infestation. The infested trees are mostly light attacks, except in a few instances where they occur on the north slopes. The timber stand throughout the unit seems weak and decadent and a very high percentage of the insect-infested trees are one-sided attacks and are largely infected with root fungi.

YELLOW DOG CREEK UNIT

4,120 Acres

	: Trees on strip	:	Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	
187	: 46	:	8,188	: .246

Percent of stand killed: .56

Total of infested trees: 1,093

Although the number of infested trees per acre is higher in this unit than in 1937, the percentage of stand killed is not comparable to that in adjacent units. The infestation is heaviest in sections 16 and 21 near the Yellow Dog River unit.

DOWNEY CREEK UNIT

4,160 Acres

Acres of sample strip	: Trees on strip	:	Trees per acre of strip	:	Trees per acre of strip
	New attacks:Green trees	:	New attacks:Green trees	:	New attacks:Green trees
205	: 71	:	7257	:	.341 : 35.4

Percent of stand killed: 0.97

Total of infested trees: 1,419

Although the infested trees per acre are nearly as heavy as in 1937, the 1938 infestation is not grouped as it was last year. The control measures instituted in the area of heavily concentrated infestation between Downey and Grizzly Creeks were apparently very effective, as very little new infestation was found there. The 1938 infestation is somewhat heavier in parts of the unit. One of these areas of heavier infestation occurs in the east fork of Downey Creek. It is of rather indefinite size and runs about 0.5 infested tree per acre. Another area, which is small, lies across from the mouth of the east fork and contains about 30 infested trees. This last area is typical of dry-site areas in that the trees are lightly attacked and the infested length is very short. A very high percentage of these infested trees are infected with root fungi.

NORTH YELLOW DOG UNIT

840 Acres

	: Trees on strip	:	Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees
60	: 12	:	1,785 .200 : 29.7

Percent of stand killed: .67

Total of infested trees: 168

There has been a considerable amount of variation in the infestation in this unit during the past four years. Although the infestation in the past has reached a height of 0.8 infested tree per acre, it dropped the following year to an extremely low point. The present infestation will probably increase to some extent in 1939.

LOWER FLAT CREEK UNIT

4,120 Acres

	: Trees on strip	:	Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees
143	: 16	:	2,922 .112 : 20.4

Percent of stand killed: .54

Total of infested trees: 461

Although the infestation in the Flat Creek unit is considerably heavier this year than in 1937, it has not reached serious proportions. The majority of the attacks are in the younger stand in sections 4 and 5.

BENNETT CREEK UNIT

580 Acres

	: Trees on strip	:	Trees per acre of strip
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees
30	: 1	:	676 .033 : 22.5

Percent of stand killed: .15

Total of infested trees: 19

A thirty-acre sample strip showed only one infested tree, which is a normal infestation for this area.

BRETT-MINER UNIT

1,550 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	New attacks	Green trees	New attacks	Green trees
64	:	1	:	377
	:		:	.016
			:	5.9

Percent of stand killed: .26

Total of infested trees: 25

The infestation is very low in this area. The white pine stand is very lightly stocked and is mixed with hemlock and Douglas fir.

ROCK CITY UNIT

1,600 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	New attacks	Green trees	New attacks	Green trees
84	:	4	:	1,136
	:		:	.048
			:	13.5

Percent of stand killed: .35

Total of infested trees: 77

There is no serious infestation in the Rock City area. The infestation is practically the same as last year's and it is not grouped. The area is quite sparsely timbered with a young stand of pine which extends up the creeks on the north slopes.

HAWKSITE UNIT

5,780 Acres

	: Trees on strip		: Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees		: New attacks:Green trees	
225	: 17	: 3,894	: .075	: 17.3

Percent of stand killed: .43

Total of infested trees: 658

The infestation in this unit is widely scattered and is not severe.

CABIN CREEK UNIT

7,000 Acres

	: Trees on strip		: Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees		: New attacks:Green trees	
170	: 22	: 3,142	: .129	: 18.5

Percent of stand killed: .69

Total of infested trees: 903

The infestation is scattered throughout the unit with apparently no concentration. Although the infestation is somewhat higher than in 1937, it is not believed to be serious.

BIG ELK UNIT

4,960 Acres

	: Trees on strip		: Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees		: New attacks:Green trees	
192	: 5	: 1,965	: .054	: 10.24

Percent of stand killed: .25

Total of infested trees: 268

The infestation in the Big Elk Creek drainage is not serious.

The timber stand is largely mature and thinly stocked and does not seem to be the type to suffer severe insect losses. Although an occasional large tree is attacked by insects, it is thought that in most instances the insects are largely a secondary factor in the tree's destruction.

POPTER CREEK UNIT

3,800 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	New attacks	Green trees	New attacks	Green trees
154	:	14	:	4,447 .091 : 28.8

Percent of stand killed: .31

Total of infested trees: 346

Even though the infestation shows a slight increase over last year, it is considerably below the average for the past eight years. The timber in this area is believed to be up for sale and logging operations will probably start within the next two years. If the logging operations are undertaken, the annual loss for the next few years will not be great.

STEWART CREEK UNIT

2,200 Acres

	Trees on strip		Trees per acre of strip	
Acres of sample strip	New attacks	Green trees	New attacks	Green trees
54	:	5	:	915 .093 : 17.0

Percent of stand killed: .54

Total of infested trees: 205

The 1938 infestation in Stewart Creek is slightly lower than in 1937. The attacked trees are largely on the southern exposures and are not felt to be a potential source of a serious infestation.

UPPER FLAT CREEK UNIT

3,680 Acres

	: Trees on strip		: Trees per acre of strip	
Acres of sample strip	: New attacks:Green trees	:	New attacks:Green trees	
194	: 47	:	2,386	: .242 : 12.3

Percent of stand killed: 1.9

Total of infested trees: 890

The infestation throughout the upper Flat Creek unit increased by several hundred percent during the present season. Although the infestation is about 0.2 infested tree per acre over the entire area, there is a spot of rather heavy concentration in sections 1 and 2 on the north side of Flat Creek. The area is about 20 chains wide and covers about 200 acres, and has from 200 to 300 infested trees. The area of concentration is in a relatively young stand along a steep south slope just above the creek. The stand is very thick and somewhat mixed with Douglas fir. From a brief examination of some of the infested trees, a light increase was indicated for the next season.

COST ANALYSIS OF THE 1938 SURVEY

Transportation	\$148.29
Subsistence	295.79
Wages	1691.47
Miscellaneous and Equipment	18.67
Terrell's Salary, 1-1 1/3 month	220.34
 Total	 \$2374.56

Effective Man days	182
Noneffective Man days (30 cook, 19 camp and travel, 87 Sundays, holidays and annual leave)	136
Supervision	38
 Total	 356

Miles of sample strip	577
Miles of sample strip per effective man day	3.17